

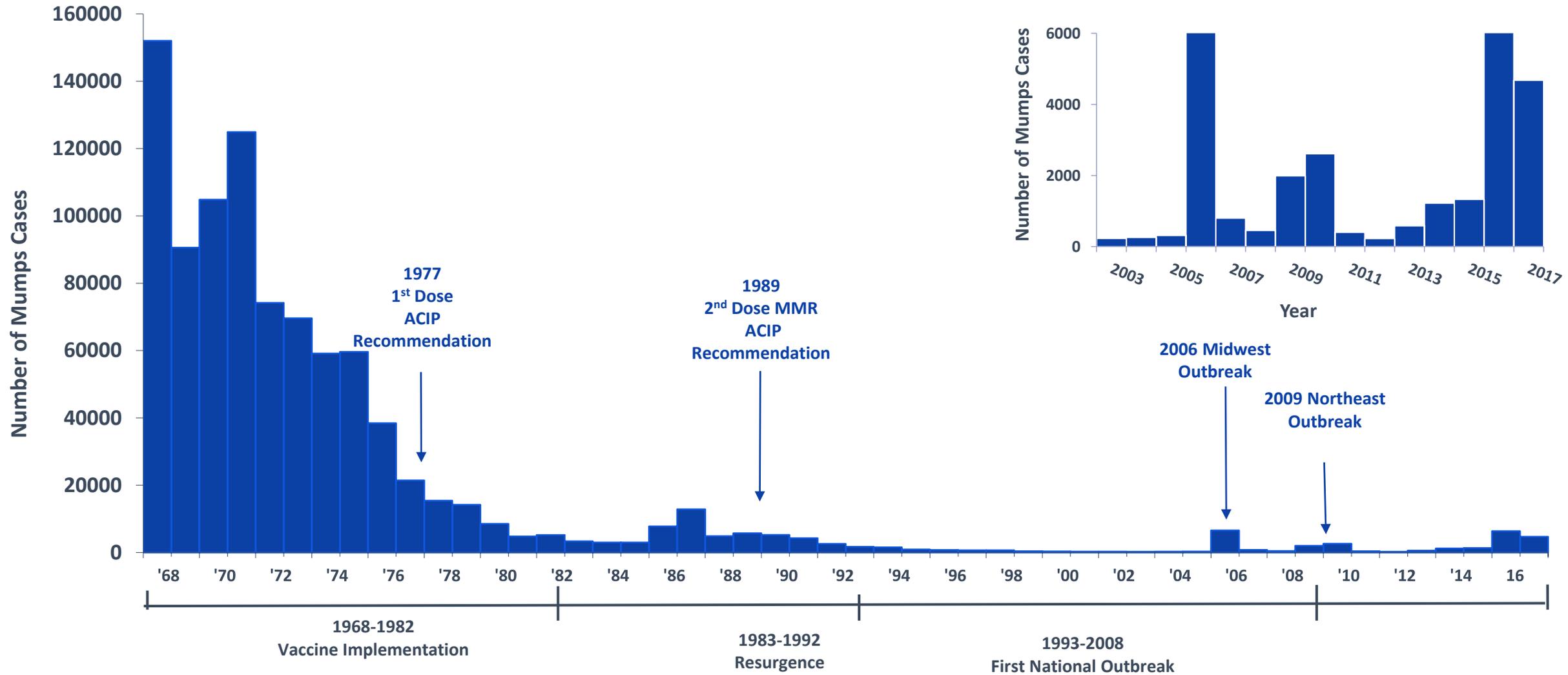


Update on Mumps Epidemiology, United States

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Number of Reported Mumps Cases, United States – 1968 - 2017



Source: National Notifiable Diseases Surveillance System (passive surveillance); 2017 data as of October 7, 2017.

Mumps Cases and Outbreak (OB) Related Data – 2011 - 2017

	2011	2012	2013	2014	2015	2016	Oct 2017
Case Count	404	229	584	1223	1329	6366	4677
Incidence rate	1.3	0.7	1.9	3.8	4.2	20.0	14.4
OB Cases	128	3	313	747	836	4975	3120
% of OB Cases	32	1.3	54	61	63	78	67
Jurisdictions w/OB cases	9	3	11	15	14	32	33

Mumps Cases and Incidence by Year, January 2011 - Oct 2017

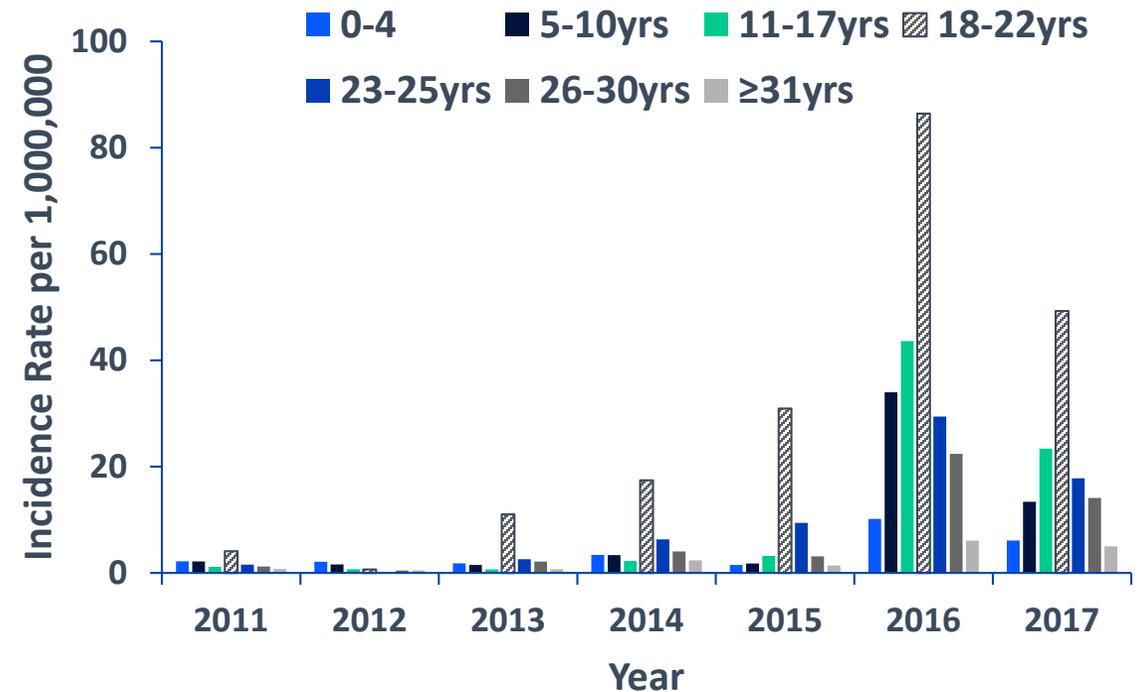


Source: National Notifiable Disease Surveillance System (passive surveillance); 2017 data as of October 7, 2017.

Characteristics of Reported Mumps Cases, United States, 2017

- Highest incidence: 18-22 years of age
- Age: median=21 years (IQR=15-31 years)
- Vaccination status: 75% ≥ 2 MMR doses

Reported Mumps Incidence Rates by Year and Age Group, United States, 2011-2017



Source: National Notifiable Disease Surveillance System (passive surveillance); 2017 data as of October 12, 2017.

Vaccination status calculated as percent of persons with known vaccination status and for whom information on number of doses was reported.

IQR=Interquartile range

Characteristics of Mumps Outbreaks and Outbreak-Associated Cases, January 2016-June 2017

Information on Mumps Outbreaks

- CDC obtains information on mumps outbreaks in three ways
 - Media reports
 - Direct phone call notification by jurisdictions
 - National Notifiable Diseases Surveillance System (NNDSS)
 - Case-based surveillance to monitor disease activity nationally
 - Not always possible to determine the number or size of outbreaks
- July 2017, CDC requested jurisdictions submit mumps outbreak data
 - To better characterize burden of outbreaks nationally

Methods: Mumps Outbreak Data Collection Tool

- Data collection tool sent to all 50 states and 2 jurisdictions (DC and NYC) that transmit data to NNDSS
 - Aggregate data from individual outbreaks that met the CSTE* case definition (≥ 3 cases linked by space and time)
 - Timeframe: January 1st 2016 – June 30th 2017
- Data collection tool consisted of 3 sections 
 - Description of outbreak
 - Total number of cases/outbreak
 - Length of outbreak
 - Setting
 - Groups affected
 - Characteristics of case-patients
 - Demographic characteristics
 - Vaccination status
 - Complications
 - Control measures implemented
 - Isolation
 - Exclusion
 - Use of outbreak/3rd dose of MMR vaccine (MMR3)

*CSTE: Council of State and Territorial Epidemiologists

Clemmons N et al. Reported mumps cases and outbreaks, United States, 2016-June 2017. *IDweek* 2017.

Outbreak Data: January 2016 - June 2017

- Response rate: 98% (51/52 jurisdictions)
- 150 mumps outbreaks (9,200 cases)*
 - 39 (76%) jurisdictions reported outbreaks
 - Median number of cases per outbreak: 10 (IQR: 4-26)
 - Median age of case-patients: 21 years (IQR: 19-22)
 - Outbreak/MMR3 dose used in 35 (23%) outbreaks

*Some outbreaks began in 2015 and continued into 2016.

IQR=Interquartile range

Outbreak dose: an MMR dose was administered without checking individual records prior to vaccination.

MMR3 dose: dose was administered after checking individual records and persons with documented 2 doses of MMR vaccine received a 3rd dose.

Mumps Outbreaks by Setting, United States, January 2016 - June 2017

Setting	Outbreaks (N=150)		Cases (N=9,200)	
	N	%	N	%
University	75	50	3,664	40
Sports team	4	3		
Greek organizations	3	2		
Community	48	32	5,238	57
Organized groups*	25	15		
Close-knit	16	11		
Sports teams	2	1		
Other (wide-spread)	7	5		
Schools (other than university)	19	13	272	3
Sports teams	6	4		
Households	8	5	26	0.3

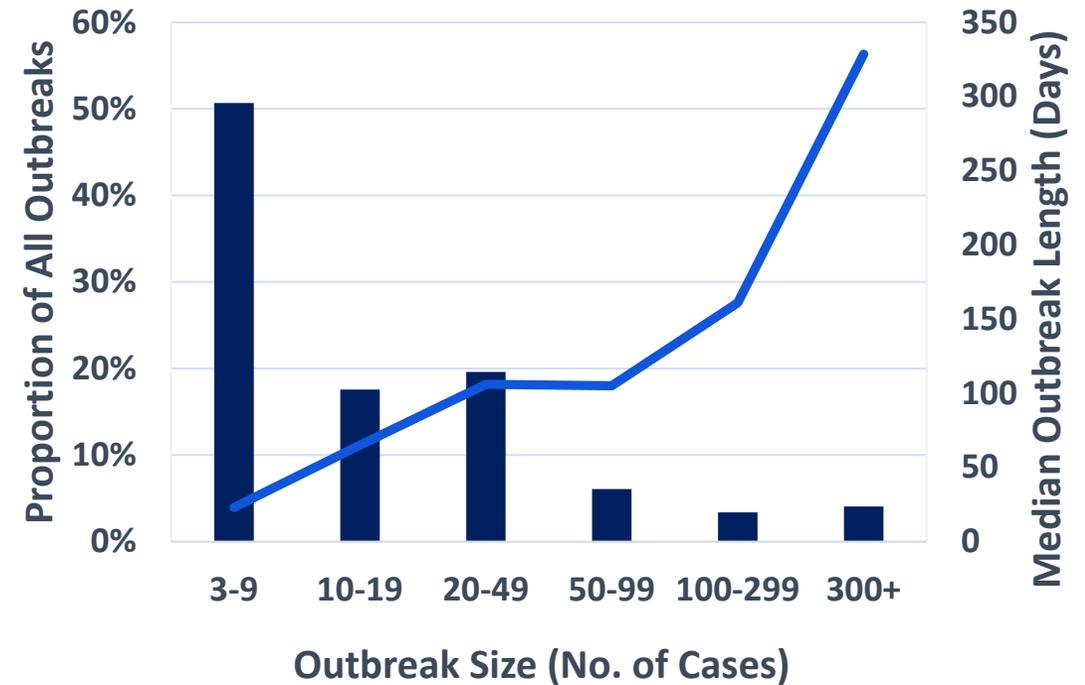
*Organized groups include: churches, workplace, theater groups, parties, fitness centers, other.

Mumps Outbreaks by Size and Median Duration, United States, January 2016 - June 2017

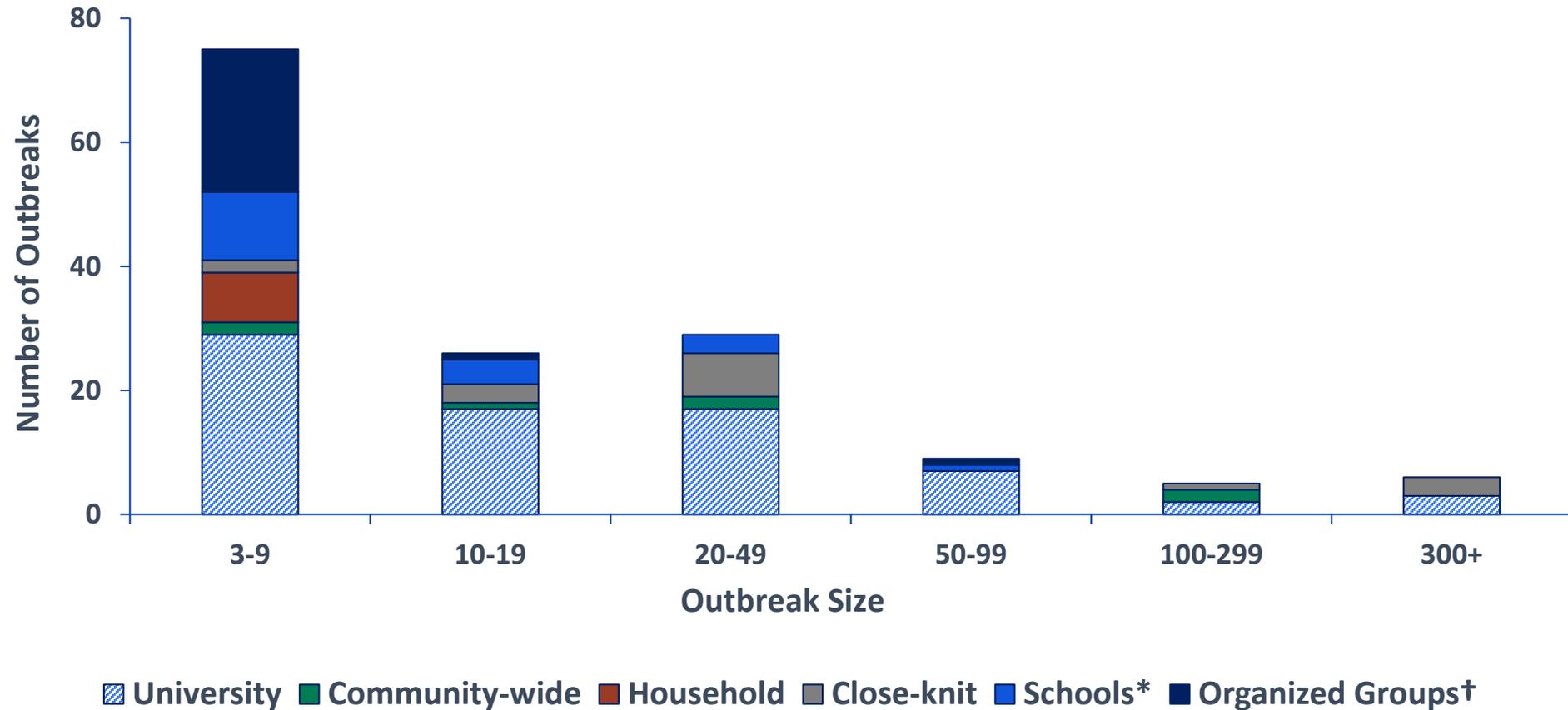
Outbreak Size (No. of Cases)	N (%)	Median Duration Days (IQR)	Median Age Yrs (IQR)
3-9	75 (50)	23 (19-40)	21 (20-25)
10-19	26 (17)	65 (50-80)	21 (20-22)
20-49	29 (19)	106 (74-133)	20 (19-21)
50-99	9 (6)	105 (102-128)	21 (21-21)
100-299	5 (3)	161 (160- 165)	17 (16-21)
300 or more	6 (4)	328.5 (317-414)	20 (17-20)

- Outbreaks with ≥ 50 cases accounted for 83% of all outbreak-related cases

Proportion of Outbreaks and Median Duration by Outbreak Size, United States, 2016-June 2017



Mumps Outbreaks by Size and Setting, United States, January 2016 - June 2017



*Schools: K-12, dance, hair and any other school that is not a university setting.

†Organized groups: workplace, theater groups, parties, fitness centers, other.

Mumps Outbreaks by Setting and Use of an Outbreak/MMR3 Dose, United States, January 2016 - June 2017

Setting	Outbreaks (N=150)	Outbreak/ MMR3 (N=35)
	N (%)	N (%)
University	75 (50%)	24 (32%)
Sports team	4	2
Greek organizations	3	1
Community	48 (32%)	9 (19%)
Organized groups*	25	1
Close-knit	16	8
Sports teams	1	0
Other (wide-spread)	7	0
Schools (other than university)	19 (13%)	2 (11%)
Sports teams	6	1
Households	8 (5%)	0 (0%)

Median number of outbreak/MMR3 doses administered (IQR): 394 (89-1,505) (data available for 29 of 35 outbreaks)

Mumps Case-patients and Complications by Vaccination Status, United States, January 2016 - June 2017

Vaccination Status	Case-Patients N (%)	Mumps Complications* N (%)
3 doses	350 (3.8)	2 (0.6)
2 doses	5,015 (54.5)	139 (2.8)
1 dose	598 (6.5)	7 (1.2)
0 doses	1,224 (13.3)	19 (1.6)
Unknown Doses	2,013 (21.9)	103 (5.1)
Total	9,200 (100)	270 (2.9)

*Complication percentages are based on the number of case patients for the respective vaccination status.

Mumps Complications – Before and After Implementation of the MMR Vaccine Program

Complications	Pre-vaccine Era (%) [*]	Published 2006-2015 Outbreaks (%) [†]	Jan 2016-June 2017 Outbreaks (%)
Orchitis‡	up to 30	3-11	4.3
Oophoritis	~5	≤1-1	0.3
Mastitis‡	up to 30	≤1	0.4 [§]
Hearing loss	4	≤1	0.4
Pancreatitis	4	≤0.1	0.4 [§]
Aseptic meningitis	1-15	0.2-0.5	0.1
Encephalitis	0.03-0.5	0-0.3	0.02
Hospitalizations	5.5	<1-2	0.8

^{*}McLean HQ et al. *MMWR* 2013; [†]Data from published US outbreak investigations 2006-2015; [‡]Assessed in postpubertal male/female patients; [§]Data from 2016-2017 ELC Enhanced Mumps Surveillance Group (9 states = 33% of outbreak cases).

Conclusions

- Mumps outbreaks continue to be a public health burden
- Young adults are at highest risk
- Half of all outbreaks occurred in university settings
- Half of outbreaks were less than 10 cases
 - 13% had ≥ 50 cases and accounted for over 80% of all cases
- Rates of complications in vaccinated persons remain low

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